

299-E13-51 (A5867) Log Data Report

Borehole Information:

Borehole: 299-E13-51 (A5867)			Site: 216-B 20 Trench		
Coordinates (WA St Plane)		GWL¹ (ft):	N/A	GWL Date:	05/07/08
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type
134306.402	573380.762	12/1965	227.317	100	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded Steel	2.0	4 1/2	4	1/4	2	80
Welded Steel	0.0	6 5/8	6	5/16	0	100

Borehole Notes:

According to the driller's log, this borehole was originally drilled in 1965 to 100 ft using 6-in. casing. In 1981, a portion of a "broken 6-in. pipe" was removed, which may have been the top 20 ft. A 4-in liner was placed to the bottom of the borehole (apparently 80 ft.) Grout was introduced between the 4- and 6-in casings. Maximum logging depth was 76 ft.

The 4" casing was measured with a steel tape and the 6" casing information was taken from Hanford Wells. There is grout in the annulus between the 4 & 6 in. casing. Zero reference is the top of the casing.

On May 7, 2008, this hole was logged again with the Neutron Moisture Logging System (NMLS) for the purpose of investigating completion materials.

Logging Equipment Information:

Logging System:	Gamma 1B		Type:	SGLS HPGe (35%)
Effective Calibration Date:	05/25/2007	Calibration Reference:	Serial No.:	36TP21095A
		Logging Procedure:	HGLP-CC-017	
			HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4H		Type:	NMLS
Effective Calibration Date:	05/25/2007	Calibration Reference:	Serial No.:	H310700352
		Logging Procedure:	HGLP-CC-021	
			HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat
Date	11/06/07	11/07/07	11/07/07
Logging Engineer	McClellan	McClellan	McClellan
Start Depth (ft)	2.0	55.0	20.0
Finish Depth (ft)	56.0	76.0	12.0
Count Time (sec)	200	200	200
Live/Real	R	R	R
Shield (Y/N)	N	N	N
MSA Interval (ft)	1.0	1.0	1.0
ft/min	N/A	N/A	N/A
Pre-Verification	AB018CAB	AB019CAB	AB019CAB

HGLP-LDR-191, Rev. 1

Log Run	1	2	3 Repeat
Start File	AB018000	AB019000	AB019022
Finish File	AB018054	AB019021	AB019030
Post-Verification	AB018CAA	AB019CAA	AB019CAA
Depth Return Error (in.)	0	None	1.0 high
Comments	No fine gain adjustments made	No fine gain adjustments made	Repeat section

NMLS Log Run Information:

Log Run	4	5 Repeat	
Date	05/07/08	05/07/08	
Logging Engineer	Spatz	Spatz	
Start Depth (ft)	0.0	5.0	
Finish Depth (ft)	79.75	15.0	
Count Time (sec)	15	15	
Live/Real	R	R	
Shield (Y/N)	N	N	
MSA Interval (ft)	0.25	0.25	
ft/min	N/A	N/A	
Pre-Verification	DHD82CAB	DHD82CAB	
Start File	DHD82000	DHD82312	
Finish File	DHD82311	DHD82352	
Post-Verification	DHD82CAA	DHD82CAA	
Depth Return Error (in.)	Low 1	0	
Comments	None	Repeat Section	

Logging Operation Notes:

Data for SGLS were collected using Gamma 1, HO 68B-3574. Pre- and post-survey verification measurements were acquired in the Amersham KUTh-118 field verifier. A centralizer was not installed on the sonde because of casing configuration.

Data for NMLS were collected using Gamma 4, HO 68B-3673. Pre- and post-survey verification measurements were acquired in the standard field verifier. A centralizer was not installed on the sonde.

Analysis Notes:

Analyst:	M.J. Legler	Date:	3/28/08; 5/15/08	Reference:	GJO-HGLP 1.6.3, Rev. 0
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The pre- and post-survey verification spectra for the SGLS met the acceptance criteria for the established system, but the verification files AB019CAB and AB019CAA had measurements for the full width half maximum above control limits for the 1461 keV energy line.

A casing correction for a combined 1/4 + 5/16-in. thick casing from 0 – 80 ft, was applied during analysis.

SGLS spectra were processed in batch mode in APTEC SUPERVISOR to identify peaks and count rates. Concentrations were calculated using an EXCEL template identified as G1Bmay07.xls using an efficiency function and corrections for casing, and dead time as determined by annual calibrations.

NMLS spectra were processed in batch mode in APTEC SUPERVISOR to identify counts. Concentrations for count rates were calculated using an EXCEL template identified as G4HNov07.xls. NMLS data were presented in counts per second because no calibration data available for 4-in casing.

Results and Interpretations:

The only manmade radionuclide detected was Cs-137, which was detected at an interval of 5 to 19 ft and intermittently at several depths below 20 ft to total depth logged. The maximum concentration is measured at approximately 83 pCi/g at 18 ft. Inspection of the individual spectra at depths below 20 ft indicates that these detections may be statistical fluctuations.

The driller's log (1965) indicates contamination >400 cpm from 12 to 20 ft, approximately 100 cpm from 20 to 90 ft, and no contamination between 90 and 100 ft. The low level contamination below 20 ft may not be detectable with the SGLS because of the double casing and grout, or the contamination may have decayed away since 1965.

Pacific Northwest Laboratory logged this borehole in 1987 with a NaI total gamma logging system. The profile of this total gamma log appears to be generally consistent with the current SGLS total gamma log.

The NMLS data indicates the presence of grout between 13 ft and 74 ft. The higher neutron count rate at 10 ft may indicate the point at which the 6-in. casing was broken. Decreases in neutron count rate at 18, 51, and 67 ft may indicate gaps in the grout. Note that the Cs-137 peak at 18 ft coincides with a decrease in the neutron count rate. Both the neutron log and spectral gamma data suggest that little or no grout is present between ground surface and approximately 9 ft depth.

The repeat logs for SGLS and NMLS show good repeatability.

List of Log Plots:

Depth Reference is top of casing

Man-made Radionuclides

Natural Gamma Logs

Combination Plot

Total Gamma & Dead Time

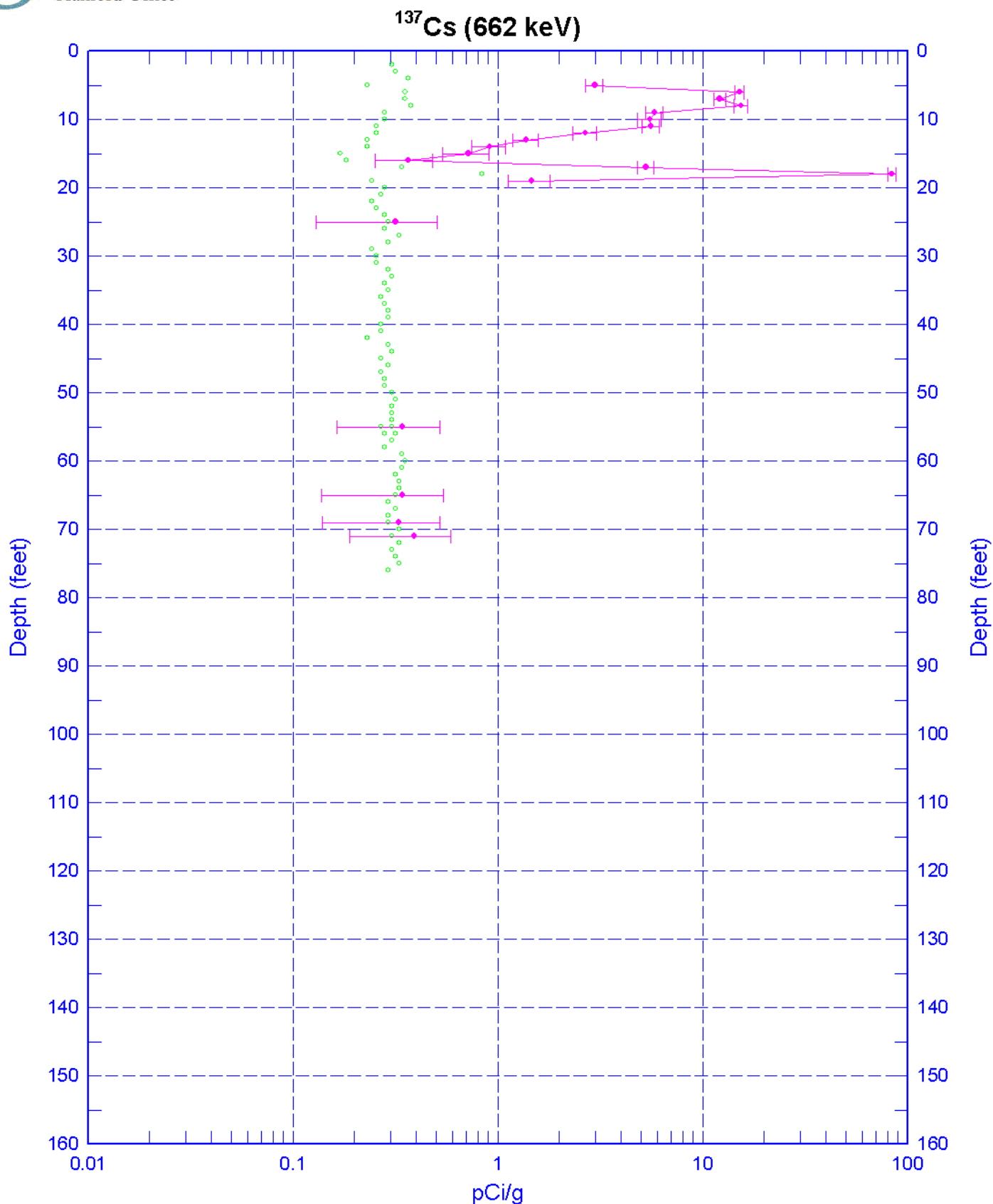
Repeat Section of Man-made Radionuclides

Repeat Section of Natural Gamma Logs

Repeat Section of Moisture Log

¹ GWL – groundwater level

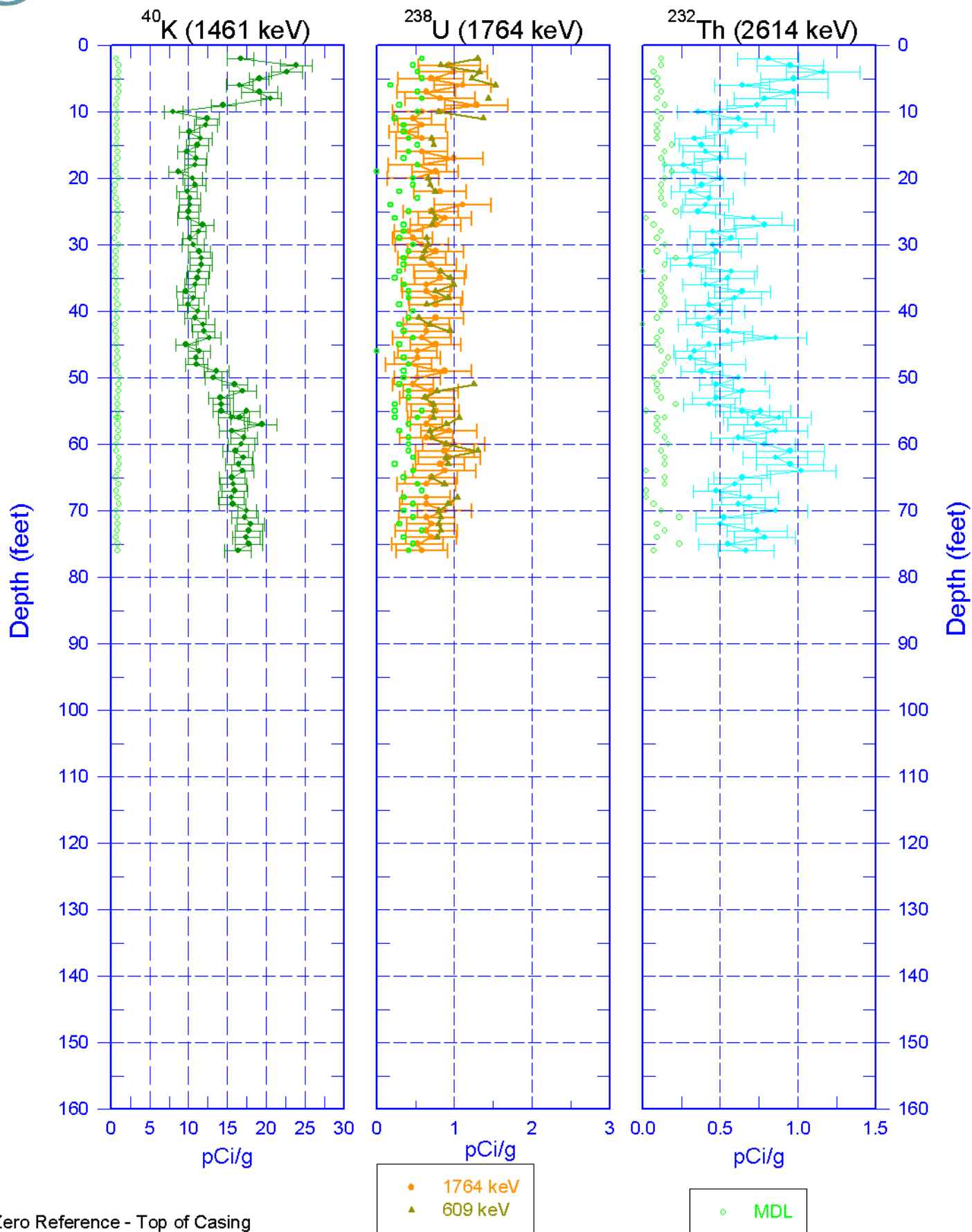
299-E13-51(A5867) Manmade Radionuclides



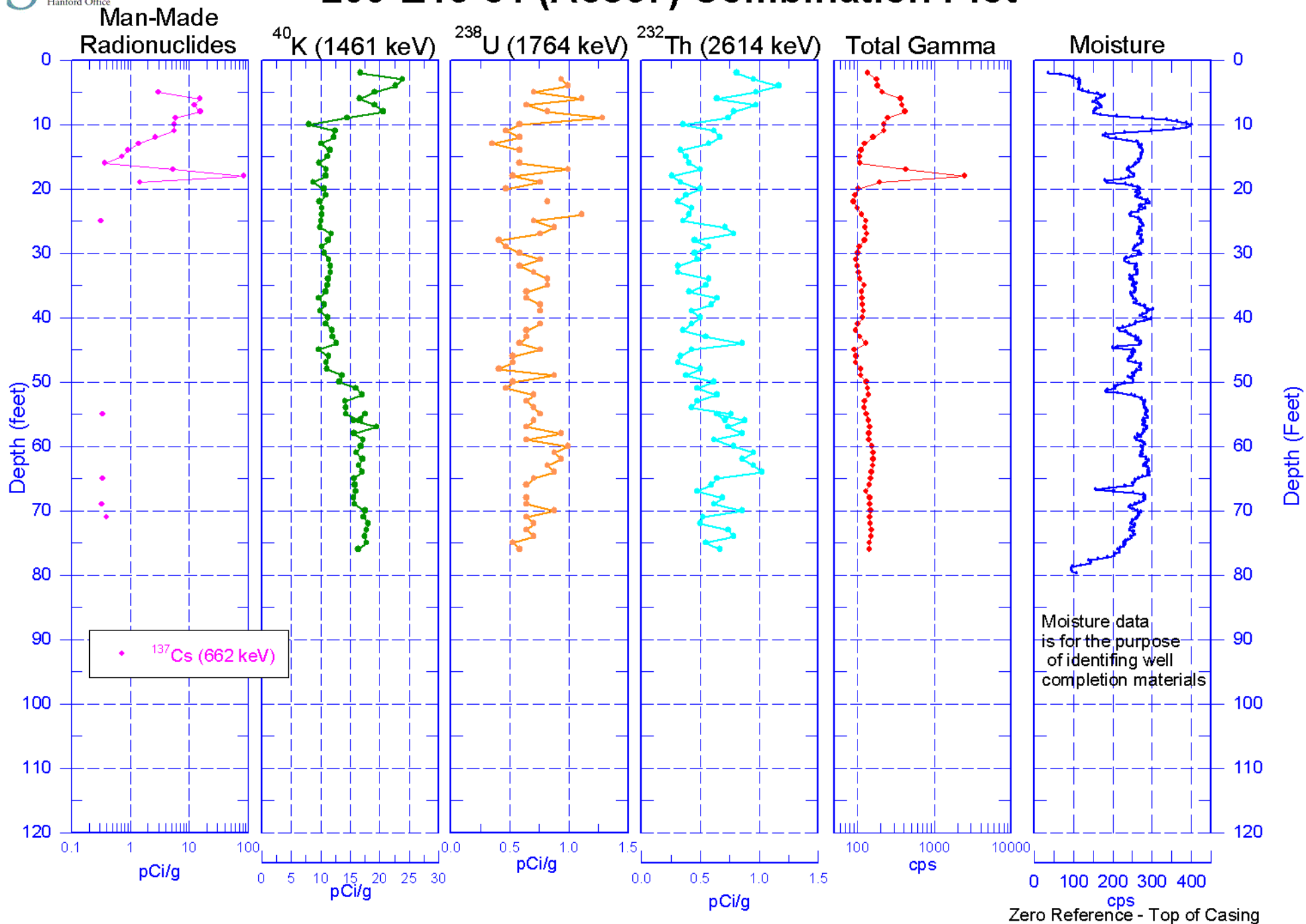
Zero Reference - Top of Casing

◦ MDL

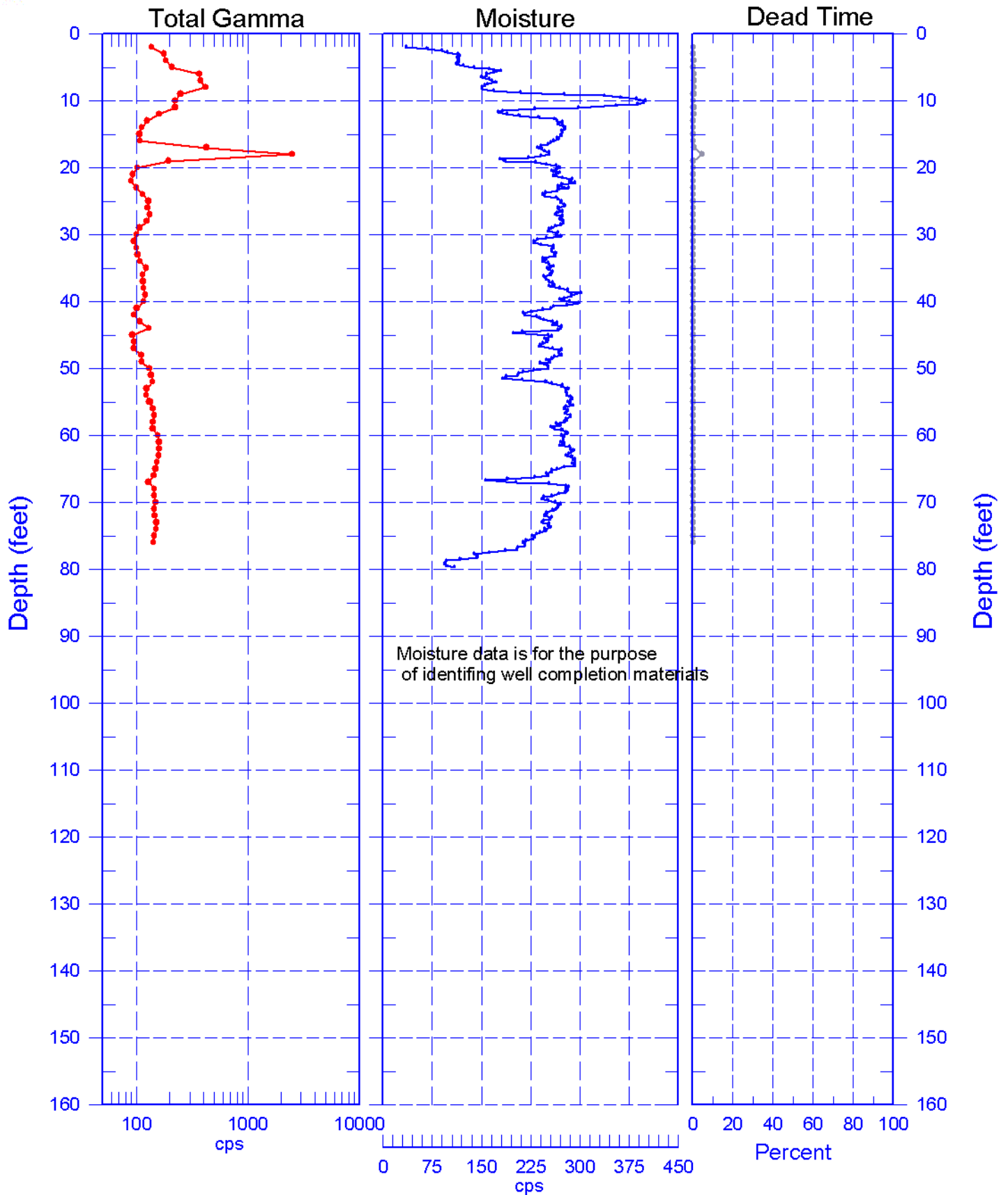
299-E13-51 (A5867) Natural Gamma Logs



299-E13-51 (A5867) Combination Plot

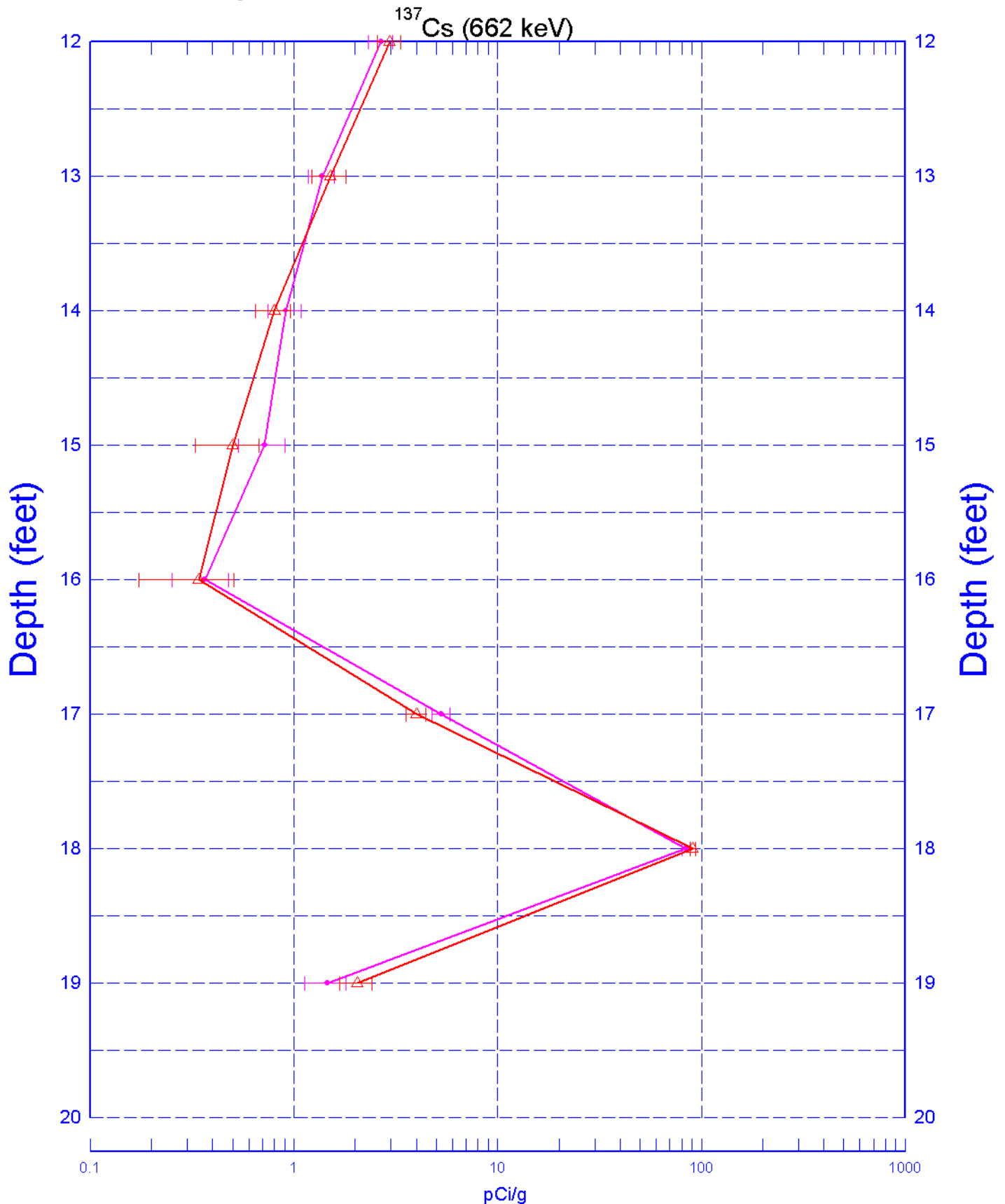


299-E13-51 (A5867) Total Gamma, Moisture & Dead Time



299-E13-51 (A5867)

Repeat Section of Manmade Radionuclides

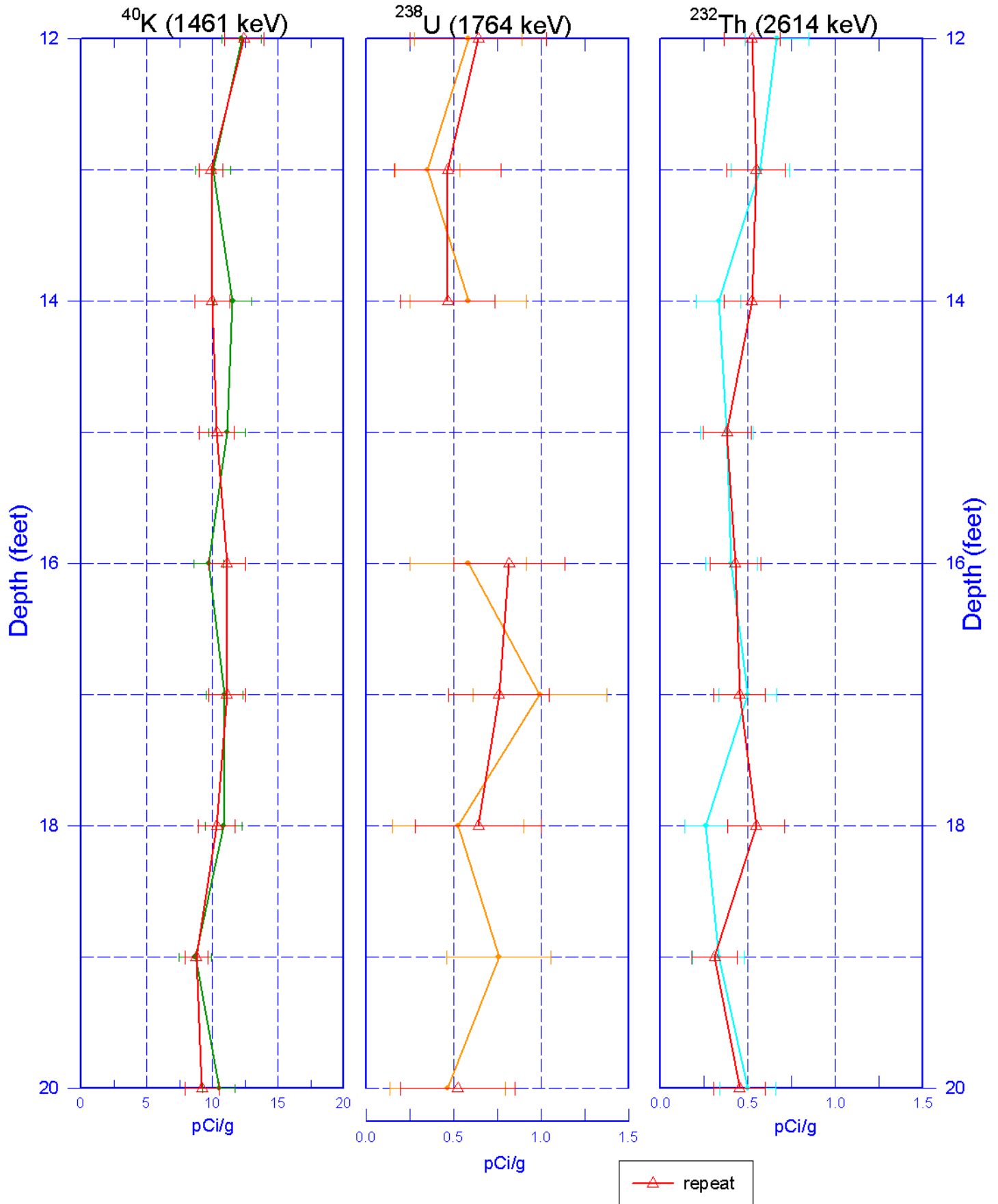


Zero Reference - Top of Casing

—△— Repeat

299-E13-51 (A5867)

Repeat Section of Natural Gamma Logs



299-E13-51 (A5867)

Repeat Section of Neutron Moisture Log

Moisture

